

APR 26 2007

Appn. No.: 10/782,097
Amendment Dated April 26, 2007
Reply to Office Action of March 21, 2007

MAT-8510US

Remarks/Arguments:

Applicants' representative has made minor amendments to the claims. The amendments are strictly to improve the readability of the claims and do not constitute language that would require a new search.

Applicants' disclosure is directed to a digital signal transceiver. The transceiver includes a frequency modulator. The frequency modulator includes a variable frequency oscillator and a frequency divider unit. The frequency divider unit switches between a modulating frequency divider and a non-modulating frequency divider. In this way, the frequency modulator is operable to output modulated signals and non-modulated signals.

Claims 1-15 stand rejected under 35 U.S.C. § 103(a) as anticipated by Applicants' admitted prior art in view of Clementi (U.S. Patent No. 6,294,936). It is respectfully submitted, however, that the claims are patentable over the art of record for the reasons set forth below.

Applicants' admitted prior art, as depicted in Applicants' Fig. 5, is directed to a digital signal transceiver. The transceiver includes frequency modulator 61. Frequency modulator 61 has input port 61b for receiving a modulating signal and always outputs a modulated signal. See Fig. 5 and page 4, lines 3-6.

Clementi is directed to a phase-locked loop (PLL) circuit 12. PLL 12 includes: variable frequency oscillator 22 for generating a reference signal; frequency divider 24 for frequency dividing the reference signal; frequency divider 26 in a feedback circuit for frequency dividing the feedback signal; comparator 34; and charge pump 30. See Fig. 2.

Applicants' invention, as recited by claim 1, includes a feature which is neither disclosed nor suggested by the art of record, namely:

...a first frequency divider unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the variable frequency oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal.... (emphasis added)

In the exemplary embodiment described in Applicants' specification, this means that Applicants' frequency modulator switches between two frequency dividers. One frequency divider outputs a modulated signal. The other frequency divider outputs a non-modulated

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signal. In this way, Applicants' frequency modulator is operable to output a non-modulated signal or a modulated signal. This feature is found in the originally filed application at page 9, line 27 through page 10, line 3; page 12, lines 3-6; and Fig. 2. No new matter has been added.

In Applicants' admitted prior art, as shown in Fig. 5, transceiver 103 includes switch 43 for switching antenna 41 between port 43a in receiving mode and port 43b in transmitting mode. Frequency modulator 61 outputs modulated signal 61a to both receiving mixer 54 (disposed in the receiving portion of the transceiver) and power amplifier 44 (disposed in the transmitting portion of the transceiver). Accordingly, frequency modulator 61 outputs a modulated signal in both transmitting and receiving modes.

This is different because Applicants' transceiver includes a frequency modulator that outputs a modulated signal in transmitting mode but outputs a non-modulated signal in receiving mode. Conversely, Applicants' admitted prior art discloses a frequency modulator that outputs a modulated signal in both transmitting and receiving modes. Additionally, as the Office Action points out on page 4, Applicants' admitted prior art does not disclose a variable frequency oscillator and a first frequency divider that switches between a modulating frequency divider and a non-modulating frequency divider, the non-modulating frequency divider receiving a signal output from the variable frequency oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving a signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal. Accordingly, Applicants' admitted prior art does not include all the features of Applicants' claim 1.

Clementi discloses PLL 12. PLL 12 includes two frequency dividers, reference frequency divider 24 and feedback frequency divider 26. Reference frequency divider 24 receives a reference signal output from oscillator 22 and outputs a reference signal. Feedback frequency divider 26 is disposed in a feedback loop of the circuit, receives the output of voltage-controlled oscillator (VCO) 36 and outputs a feedback frequency.

This is different because Clementi does not disclose switching between the two frequency dividers and does not disclose a first frequency divider that receives a signal output from the VCO and outputs a non-modulated signal and a second frequency divider that receives a signal output from the VCO and a modulating signal and outputs a modulated signal, as required by Applicants' claim 1.

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Clementi does not disclose switching between two frequency dividers. As shown in Fig. 2, Clementi discloses use of both reference divider 24 and feedback divider 26 together, not alternatively. Outputs of reference frequency divider 24 and feedback frequency divider 26 are fed into comparator 28 so they can be compared and, if comparator 28 finds a difference between F_{ref} and F_{vco} , adjustment can be made to ensure that PLL 12 is outputting a signal having a consistent frequency. Thus, the outputs of both frequency dividers are constantly in use for proper operation of the circuit. Conversely, Applicants' frequency modulator includes a switch for switching between a modulating frequency divider and a non-modulating frequency divider, depending on whether the transceiver is operating in transmitting or receiving mode. Accordingly, Clementi's PLL is different from Applicants' frequency modulator at least because Clementi does not disclose switching between two frequency dividers.

Clementi does not disclose a non-modulating frequency divider that receives a signal output from a variable frequency oscillator. As shown in Fig. 2, reference frequency divider 24 receives a signal output from oscillator 22. Oscillator 22 outputs a stable reference frequency for comparing with the feedback frequency. See Clementi, column 4, lines 51-52 ("The reference oscillator 22 preferably is a precision oscillator such as a crystal oscillator which provides a stable oscillator frequency F_{osc} ." (emphasis added)). Conversely, Applicants' frequency modulator includes a non-modulating frequency divider 30d that receives a signal output from variable frequency oscillator 29. Accordingly, Clementi's PLL is different from Applicants' frequency modulator at least because Clementi does not disclose a non-modulating frequency divider that receives a signal output from a variable frequency oscillator.

Clementi does not disclose a modulating frequency divider that receives the signal output from the variable frequency oscillator and a modulating signal. As shown in Fig. 2, feedback frequency divider 26 only receives the signal output from VCO 36. Conversely, Applicants' frequency modulator includes frequency divider 30e that receives a signal output from VCO 29 and a modulating signal received through port 21a. Accordingly, Clementi's PLL is different from Applicants' frequency modulator at least because Clementi does not disclose a modulating frequency divider that receives the signal output from the variable frequency oscillator and a modulating signal.

Accordingly, Clementi does not disclose all the elements of Applicants' claim 1.

It is because Applicants include the feature of a first frequency divider unit that switches between a modulating frequency divider and a non-modulating frequency divider, the non-

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modulating frequency divider receiving a signal output from the variable frequency oscillator and outputting a non-modulated signal, and the modulating frequency divider receiving the signal output from the variable frequency oscillator and a modulating signal and outputting the modulated signal, that the following advantages are achieved. Applicants' transceiver uses the same variable frequency oscillator in transmitting and receiving modes, thus reducing cost. At the same time, Applicants' frequency modulator modulates the signal output from the frequency modulator only when necessary. Therefore, for example, this eliminates phase noise generated by the frequency modulator responding to a modulated signal at least in the receiving mode.

Accordingly, for the reasons set forth above, claim 1 is patentable over the art of record.

Claims 8, 12 and 14, while not identical to claim 1, include features similar to claim 1. Accordingly, claims 8, 12 and 14 are also patentable over the art for the reasons set forth above.

Claims 2-7 and 15 include all the features of claim 1 from which they depend, claims 9-11 include all the features of claim 8 from which they depend and claim 13 includes all the features of claim 12 from which it depends. Accordingly, claims 2-7, 9-11, 13 and 15 are patentable over the art for the reasons set forth above.

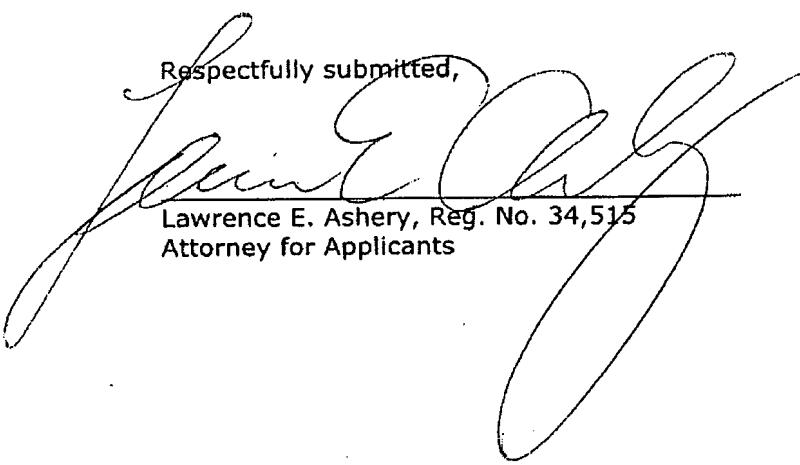
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In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,


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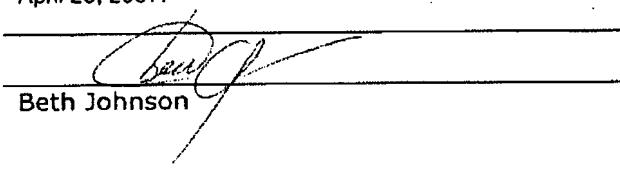
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April 26, 2007.


Beth Johnson

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